TRANSITION
NETWORKS®

User's Guide

SGETF10xx-1xx

Stand-Alone Media Converter
- **Gigabit Ethernet**
- **Copper to Fiber**
- **1000Base-T to 1000Base-SX/LX**

Transition Networks SGETF10xx-1xx Gigabit Ethernet media converter connects 1000Base-T shielded or unshielded twisted-pair copper cable to 1000Base-SX or 1000Base-LX, fiber-optic cable. The SGETF10xx-1xx is a stand-alone media converter

Part Number	Port One - Copper	Port Two - Duplex Fiber-Optic
SGETF1013-110	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-SX, 850 nm multimode 220 m *(721 ft)* *(62.5/125 µm cable)* 550 m *(1,804 ft)* *(50/125 µm cable)*
SGETF1014-110	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1310 nm single mode 10 km *(6.2 miles)**
SGETF1015-110	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1310 nm single mode 25 km (15.5 miles)*
SGETF1017-110	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1550 nm single mode 65 km *(40.4 miles)**
SGETF1024-110	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-SX, 1310 nm extended multimode, 2 km *(1.2 miles)** **Note:** 62.5/125 µm *(fiber only)*
SGETF1035-110	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1550 nm single mode 125 km *(77.5 miles)**

*Typical maximum cable distance. Actual distance is dependent upon the physical characteristics of the network installation.

Note: The chassis version of the media converter is CGETF10xx-11x. For more information, see the CGETF10xx-1xx user's guide on-line at: www.transition.com.

Part Number	Port One - Copper	Port Two - Single Fiber-Optic
SGETF1029-110	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1310 TX/1550 RX single mode, 20 km *(12.4 miles)**
SGETF1029-111	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1550 TX/1310 RX single mode, 20 km *(12.4 miles)**
SGETF1029-112	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1310 TX/1550 RX single mode, 40 km *(24.8 miles)**
SGETF1029-113	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1550 TX/1310 RX single mode, 40 km *(24.8 miles)**
SGETF1029-116	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1510 TX/1590 RX single mode, 80 km *(49.7 miles)**
SGETF1029-117	RJ-45 1000Base-T 100 m *(328 ft)**	SC, 1000Base-LX, 1590 TX/1510 RX single mode, 80 km *(49.7 miles)**
	The SGETF1029-11x and the SGETF1029-11x are to be installed in the same network, where one is the local converter and the other is the remote converter.	

* Typical maximum cable distance. Actual distance is dependent upon the physical characteristics of the network installation *(TX = transmit, RX = receive)*.

Part Number	Port One - Copper	Port Two - Single Fiber-Optic
SGETF1040-110	RJ-45 1000Base-T 100 m *(328 ft)**	Open slot for SFP modules

Sold separately, the following SFP transceiver modules for port two are compatible with the SGETF1040-110 converter and are available from Transition Networks.

SGETF1040-110	Descriptions
TN-SFP-SX	LC, 1000Base-SX, 850 nm multimode, 220-550 mm *(720-1804 ft)**
TN-SFP-SXD	LC, 1000Base-SX, 850 nm multimode, 220-550 mm *(720-1804 ft)**
TN-SFP-LX1	LC, 1000Base-LX, 1310 nm single mode, 10 km *(6.2 miles)**
TN-SFP-LX3	LC, 1000Base-LX, 1310 nm single mode, 30 km *(18.8 miles)**
TN-SFP-LX5	LC, 1000Base-LX, 1550 nm single mode, 50 km *(31.2 miles)**
TN-SFP-LX8	LC, 1000Base-LX, 1550 nm single mode, 80 km *(50.0 miles)**
TN-SFP-LX12	LC, 1000Base-LX, 1550 nm single mode, 120 km *(74.6miles)**

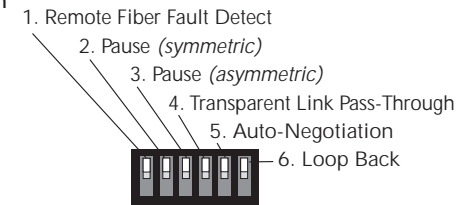*Typical maximum cable distance. Actual distance is dependent upon the physical characteristics of the network.

Note: Third-party Multi-Source Agreement (MSA) compliant Small Form Factor Pluggables (SFPs) can also be used in the SGETF1040-110.

Installation

Set the 6-position switch

The 6-position switch is located on the side of the media converter.
- Use a small flat blade screwdriver to set the recessed switches.
- All switches are shown in the default position, UP.

1. Remote Fiber Fault Detect
2. Pause *(symmetric)*
3. Pause *(asymmetric)*
4. Transparent Link Pass-Through
5. Auto-Negotiation
6. Loop Back

Note: Switch positions S2 and S3 work together to configure the media converter for Pause conditions.

S1   <u>Remote-Fault Detection</u>
up   Disabled
down   Enable

S2 & S3 work in combination
    <u>Pause</u>
    10 sw position 2 up and 3 down: Symmetric
    01 sw position 2 down and 3 up: Asymmetric
    11 sw positions 2 and 3 up: Pause is OFF *(default position)* 00 sw positions 2 and 3 down: Symmetric and Asymmetric

S4   <u>Transparent Link Pass-Through</u>
up   Enable Link Pass-Through
down   Disable Link Pass-Through

S5   <u>Fiber Auto-Negotiation</u>
up   Disable Fiber Auto-Negotiation for the fiber link *(default setting)*
down   Enable Fiber Auto-Negotiation for the fiber link

S6   <u>Loop Back</u>
up   Disable RX/TX signal loop back *(default setting)*
down   Enable RX/TX signal loop back

Installation -- Continued

<u>Install Mode</u>

During installation, set converter DIP switch 4 DOWN; leave all other switches in the UP position *(default)*. This disables Transparent Link Pass-Through and Auto-Negotiation, allowing individual copper and fiber links to be established *(both copper port LEDs will turn ON with each device-to-device connection)* independent of a complete end-to-end connection.

<u>Operation Mode</u>

After installation is complete *(all copper and fiber ports connected and linked),* set all switches to the UP position *(default))*.

<u>Fiber Auto-Negotiation</u>

Fiber Auto-Negotiation allows the fiber interface to detect and then advertise the supported features of the remote device; this occurs only when a fiber cable is connected to a device with a negotiating port. The process is as follows:

1. The fiber interface detects the supported features of the remote partner.
2. These abilities are passed to the twisted-pair interface and advertised.
3. Once the twisted-pair interface has a link at the highest common capability, it passes the result to the fiber interface.
4. The fiber interfaces then start advertising these capabilities. At this point, the link between the fiber and the negotiating port is complete.
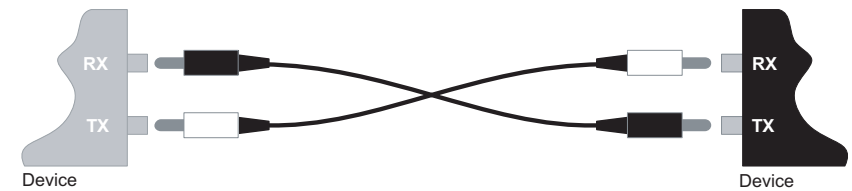
If the SGETF10xu-1xu is connected via fiber to another SGETF10xu-1xu, both media converters must have the Fiber Auto-Negotiation setting disabled *(switch 5 UP)*.

Note: Transparent Link Pass-Through *(switch position 4 enabled)* cannot be turned OFF *(disabled)* when Fiber Auto-Negotiation is ON *(enabled)*.

Installation -- continued
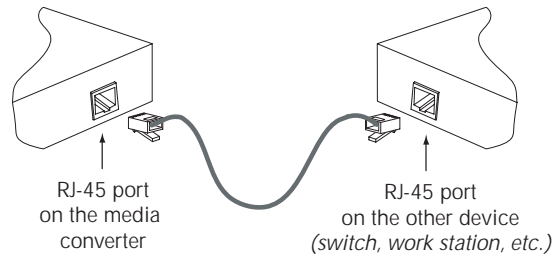
Install the fiber cable

1. Locate a 1000Base-SX/LX compliant fiber cable with male, two-stranded TX to RX connectors installed at both ends.
2. Connect the fiber cables to the SGETF10xx-1xx media converter as described:
   • Connect the male TX cable connector to the female TX port.
   • Connect the male RX cable connector to the female RX port.
3. Connect the fiber cables to the other device *(another media converter, hub, etc.)* as described:
   • Connect the male TX cable connector to the female RX port.
   • Connect the male RX cable connector to the female TX port.

Device   Device

Installation -- Continued

Install the copper cable

1. Locate a 1000Base-T compliant copper cables with male, RJ-45 connectors installed at both ends.
2. Connect the RJ-45 connector at one end of the cable to the RJ-45 port on the SGETF10xx-1xx media converter.
3. Connect the RJ-45 connector at the other end of the cable to the RJ-45 port on the other device *(switch, workstation, etc.)*.

RJ-45 port
on the media
converter

RJ-45 port
on the other device
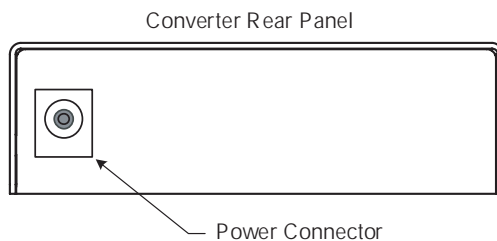*(switch, work station, etc.)*

Power the media converter

AC
The external power supply provided with this device is UL listed by the manufacturer of the power supply.

1. Install the power adapter cord to the back of the media converter.
2. Connect the power adapter plug to AC power.
3. Verify that the media converter is powered by observing the illuminated LED power indicator light.

DC
Consult the user's guide for the Transition Networks SPS1872-xx DC external power supply for powering the media converter.
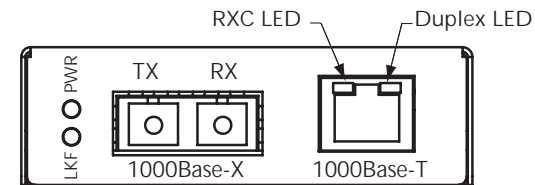
Converter Rear Panel

Power Connector

Operation

Status LEDs

Use the status LEDs to monitor the SGETF10xx-1xx media converter operation in the network.

PWR	*(Power)*	ON =	Connected to external AC power.
LKF	*(Fiber link)*	ON =	Fiber Connection
RXC	*(Copper receive)*	Flashing =	Receiving data on the copper link.
		ON =	Copper Link connection
Duplex		ON =	Full

RXC LED   Duplex LED

PWR   TX   RX

LKF

1000Base-X   1000Base-T

Remote-Fault Detect

Remote fiber fault detect (RFD) monitors the status of the fiber link. RFD must only be enabled on the remote converter. If RFD is enabled in the device at each end of the link, a link pass-through event will put the converters into an unrecoverable state *(unable to establish a link)*.

Pause

The pause feature can improve network performance by allowing one end of the link to signal the other to discontinue frame transmission for a set period of time to relieve buffer congestion.

The pause feature can be set to one of four settings:
- Disable *(i.e., no pause)*
- Symmetrical pause
- Asymmetric TX (*transmit)* pause
- Asymmetric RX *(receive)* pause

Enable the pause feature if it is present on ALL network devices attached to the media converter(s); otherwise, disable the pause feature.
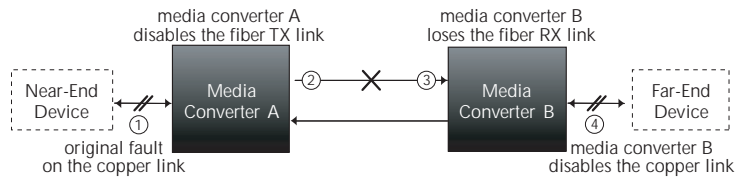
AutoCross *(always on)*

The AutoCross feature allows either straight-through (MDI) or crossover (MDI-X) cables to be used when connecting to 10Base-T, 100Base-TX, or 1000Base-T devices, such as hubs, transceivers, or network interface cards (NICs). AutoCross determines the characteristics of the cable connection and automatically configures the unit to link up to its companion device regardless of the cable configuration.

Operation - Continued

Link Pass-Through

The Link Pass-Through feature allows the media converter to monitor both the fiber and copper RX *(receive)* ports for loss of signal. Refer to the illustration below. For example, in the event of a loss of an RX signal (1), the media converter will automatically disable the fiber TX *(transmit)* signal (2), thus, "passing through" the link loss (3). The far-end device is automatically notified of the link loss (4), which prevents the loss of valuable data unknowingly transmitted over an invalid link.

Transparent Link Pass-Through

Transparent Link Pass-Through operates similar to Link Pass-Through with one exception: the fiber link between the converters remains active. A signal is passed through to the remote converter, causing it to shutdown the copper link, notifying the end device of the link failure.

Auto-Negotiation

Auto-Negotiation enables automatic configuration to achieve the best possible mode of operation over a link between devices. A device with this feature enabled will broadcast its speed *(10Mbs, 100Mbs, etc.)* and duplex *(half/full)* capabilities to another device with this feature, then negotiate the best mode of operation between them—no user intervention required.

Fiber Auto-Negotiation

Fiber Auto-Negotiation allows the fiber interface to detect and then advertise the support abilities of the remote device. It is supported only when the fiber is connected to a device with a negotiating port.

Loop Back

This diagnostic feature enables the media converter to loop back the signal from the RX port to the TX port for testing and troubleshooting purposes. Test signals from a bit-error test unit can then be inserted into either the copper or fiber link to test a particular segment.

This type of diagnostic test can only be performed from the local to the remote device with loop back enabled on the remote device.

SNMP

Note: SNMP is not supported in the SGETF10xx-1xx converters.

Cable Specifications

The physical characteristics must meet or exceed IEEE 802.3™ specifications.

Fiber cable

Bit Error Rate:	$<10^{-9}$
Single mode fiber *(recommended)*:	9 μm
Multimode fiber *(recommended)*:	62.5/125 μm
Multimode fiber *(optional)*:	100/140, 85/140, 50/125 μm
SGETF1013-110	850 nm multimode
Fiber Optic Transmitter Power:	min: -10.0 dBm max: -4.0 dBm
Fiber Optic Receiver Sensitivity:	min: -17.0 dBm max: 0.0 dBm
Link Budget:	7.0 dB
SGETF1014-110	1310 nm single mode
Fiber-optic Transmitter Power:	min: -9.5 dBm max: -3.0 dBm
Fiber-optic Receiver Sensitivity:	min: -20.0 dBm max: -3.0 dBm
Link Budget:	10.5 dB
SGETF1015-110	1310 nm single mode
Fiber-optic Transmitter Power:	min: -5.0 dBm max: -0.0 dBm
Fiber-optic Receiver Sensitivity:	min: -24.0 dBm max: -3.0 dBm
Link Budget:	19.0 dB
SGETF1017-110	1550 nm single mode
Fiber-optic Transmitter Power:	min: -3.0 dBm max: 2.0 dBm
Fiber-optic Receiver Sensitivity:	min: -24.0 dBm max: -3.0 dBm
Link Budget:	21.0 dB
SGETF1024-110	1300 nm extended multimode
Fiber-optic Transmitter Power:	min: -10.0 dBm max: -3.0 dBm
Fiber-optic Receiver Sensitivity:	min: -17.0 dBm max: -3.0 dBm
Link Budget:	7.0 dB
SGETF1035-110	1550 nm single mode
Fiber-optic Transmitter Power:	min: 0.0 dBm max: 5.0 dBm
Fiber-optic Receiver Sensitivity:	min: -27.0 dBm max: -3.0 dBm
Link Budget:	27.0 dB
SGETF1029-110	1310nm TX / 1550nm RX single mode
SGETF1029-111	1550nm TX / 1310nm RX single mode
Fiber-optic Transmitter Power:	min: -8.0 dBm max: -3.0 dBm
Fiber-optic Receiver Sensitivity:	min: -21.0 dBm max: -3.0 dBm
Link Budget:	13.0 dB

Cable Specifications -- Continued

Fiber cable - Continued

SGETF1029-112	1310nm TX / 1550nm RX single mode
SGETF1029-113	1550nm TX / 1310nm RX single mode
Fiber-optic Transmitter Power:	min: -3.0 dBm max: +2.0 dBm
Fiber-optic Receiver Sensitivity:	min: -23.0 dBm max: -3.0 dBm
Link Budget:	20.0 dB
SGETF1029-116	1510nm TX / 1590nm RX single mode
SGETF1029-117	1590nm TX / 1510nm RX single mode
Fiber-optic Transmitter Power:	min: -2.0 dBm max: +3.0 dBm
Fiber-optic Receiver Sensitivity:	min: -26.0 dBm max: -3.0 dBm
Link Budget:	24.0 dB

Copper cable (Category 5 -- minimum requirement)

- Gauge = 24 to 22 AWG; Attenuation = 22.0 dB /100m @ 100 MHz
- Straight-through OR crossover cable may be used.
- Shielded twisted-pair (STP) OR unshielded twisted-pair (UTP) may be used
- All pin pairs (1&2, 3&6, 4&5, 7&8) are active in a gigabit network.
- Use only dedicated wire pairs for the active pins; e.g., blue/white & white/blue, orange/white & white/orange, etc.
- Do not use flat or silver satin wire.

Technical Specifications

For Transition Networks' Model SGETF10xx-1xx or equivalent

Standards:	IEEE 802.3ab™, IEEE 802.3 2000
Data Rate / Delay:	1000 Mbs/300 nsec
Dimensions:	3.25" x 0.1" x 4.8" (82mm x 25mm x 122mm)
Weight:	3 oz. (91 g) approximately
Power Supply	12VDC @ 0.8A (minimum)
Power Consumption:	5.4W, 450mA @ 12VDC
Packet Size:	10 Kbytes (maximum)
MTBF*	382,000 hours (MIL217F2 V5.0) (MIL-HDBK-217F)
1,345,000 hours (Bellcore7 V5.0)	
Operating Temp:	Tmra** 0°C to 50°C (32°F to 122°F)
Storage Temp:	-15°C to 65°C (5°F to 149°F)
Humidity:	10% to 90%, non condensing
Altitude:	0 to 10,000 feet
Warranty:	Lifetime

*MTBF is estimated using the predictability method. This method is based on MIL-217F at 25°C ambient temperature, typical enclosure heat rise of 10°C, and nominal operating conditions and parameters. Installation and configuration specific MTBF estimates are available upon request. Contact Technical Support.

**Manufacturer's rated ambient temperature.

For the most up-to-date information on the SGETF10xx-1xx media converter, view the user's guide on-line at: www.transition.com.

The fiber optic transmitters on this device meet Class I Laser safety requirements per IEC-825/CDRH standards and comply with 21 CFR1040.10 and 21CFR1040.11.

WARNING: Visible and invisible laser radiation when open. Do not stare into the beam or view the beam directly with optical instruments. Failure to observe this warning could result in an eye injury or blindness.

WARNING: Use of controls, adjustments or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

IMPORTANT: Copper based media ports, e.g., Twisted Pair (TP) Ethernet, USB, RS232, RS422, RS485, DS1, DS3, Video Coax, etc., are intended to be connected to intra-building (inside plant) link segments that are not subject to lightening transients or power faults. Copper-based media ports, e.g., Twisted Pair (TP) Ethernet, USB, RS232, RS422, RS485, DS1, DS3, Video Coax, etc., are NOT to be connected to inter-building (outside plant) link segments that are subject to lightening transients or power faults.

Troubleshooting

If the media converter fails, isolate and correct the fault by determining the answers to the following questions and then taking the indicated action:

1. Is the PWR *(power)* LED illuminated?
    NO
    •   Is the power adapter the proper type of voltage and cycle frequency for the AC outlet?
    •   Is the power adapter properly installed in the media converter and in the outlet?
    •   Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.
    YES
    •   Proceed to step 2.
2. Is the RXC *(copper link)* LED illuminated?
    NO
    •   Check the twisted-pair copper cables for proper connection.
    •   Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.
    YES
    •   Proceed to step 3.
3. Is the LKF *(fiber link)* LED illuminated?
    NO
    •   Check the fiber cables for proper connection.
    •   Verify that the TX and RX cables on the media converter are connected to the RX and TX ports, respectively, on the other device.
    •   If the media converter is connected to another SGETF10xx-1xx using fiber, verify the fiber Auto Negotiate is disabled *(DIP-switch 5 in the UP position)*.
    •   Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.
    YES
    •   Proceed to step 4.
4. Is the RXC *(copper receive)* LED flashing?
    NO
    •   If there is activity on the 1000Base-T port, disconnect and reconnect the twisted-pair copper cable to restart the initialization process.
    •   Restart the workstation to restart the initialization process.
    •   Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.
    YES
    •   Contact Tech Support: 1-800-260-1312, Int'l: 00-1-952-941-7600.

Contact Us

Technical support
Technical support is available 24-hours a day
US and Canada: 1-800-260-1312
International: 00-1-952-941-7600

Transition now
Chat live via the Web with Transition Networks Technical Support.
Log onto www.transition.com and click the Transition Now link.

Web-based seminars
Transition Networks provides seminars via live web-based training.
Log onto www.transition.com and click the Learning Center link.

E-Mail
Ask a question anytime by sending an e-mail to our technical support staff.
techsupport@transition.com

Address
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10900 Red Circle Drive
Minnetonka, MN 55343, U.S.A.
telephone: 952-941-7600
toll free: 800-526-9267
fax: 952-941-2322

Declaration of Conformity

TRANSITION
NETWORKS®

Name of Mfg: Transition Networks
                    10900 Red Circle Drive Minnetonka MN 55343 U.S.A.

Model: SGETF10xx-1xx Series Media Converters

Part Number(s):   SGETF1013-110, SGETF1014-110, SGETF1015-110,
SGETF1017-110, SGETF1018-110, SGETF1024-110,
SGETF1035-110, SGETF1040-110, SGETF1029-110,
SGETF1029-111, SGETF1029-112, SGETF1029-113,
SGETF1029-116, SGETF1029-117

Regulation: EMC Directive 89/336/EEC

Purpose: To declare that the SGETF10xx-1xx to which this declaration refers is in
conformity with the following standards:

EN 55022:1994 + A1:1995 + A1:1997; EN 55024:1998 + Al:2001 + A2:2003

I, the undersigned, hereby declare that the equipment specified above conforms to the above
Directive(s) and Standard(s).

Stephen Anderson   August, 2008___

Stephen Anderson, Vice-President of Engineering   Date

Compliance Information

CE Mark

FCC regulations

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's own expense.

Canadian regulations

This digital apparatus does not exceed the Class A limits for radio noise for digital apparatus set out on the radio interference regulations of the Canadian Department of Communications.
Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

European regulations
Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Achtung !

Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten. In diesem Fäll is der Benutzer für Gegenmaßnahmen verantwortlich.

Attention !

Ceci est un produit de Classe A. Dans un environment domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilsateur de prende les measures spécifiques appropriées.

In accordance with European Union Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003, Transition Networks will accept post usage returns of this product for proper disposal. The contact information for this activity can be found in the 'Contact Us' portion of this document.

CAUTION: RJ connectors are NOT INTENDED FOR CONNECTION TO THE PUBLIC TELEPHONE NETWORK. Failure to observe this caution could result in damage to the public telephone network.

Der Anschluss dieses Gerätes an ein öffentlickes Telekommunikationsnetz in den EG-Mitgliedstaaten verstösst gegen die jeweligen einzelstaatlichen Gesetze zur Anwendung der Richtlinie 91/263/EWG zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Telekommunikationsendeinrichtungen einschliesslich der gegenseitigen Anerkennung ihrer Konformität.

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